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NOTES ON GEOGRAPHIC DISTRIBUTION

Odonata, Aeshnidae, *Anax amazili* (Burmeister, 1839): First record for southern Brazil

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ABSTRACT: The genus *Anax* comprises a group with cosmopolitan distribution and 27 species around the world. In Brazil, *Anax* is represented by three species: *A. amazili*, *A. concolor* and *A. longipes*. *Anax amazili* occurs, in South America, from French Guiana to Argentina, and in Brazil is distributed in the northeast and southeast of the country. We have reported *A. amazili* for the first time in southern Brazil, from the state of Rio Grande do Sul, extending its current distribution about 1000 km.

The genus *Anax* Leach, 1815 comprises a group of 27 species with cosmopolitan distribution (Garrison *et al*. 2006). It is characterized by vein R3 bends strongly just posterior to the distal end of the pterostigma, and the upper sector of the arculus is shorter than the lower sector. In Brazil, *Anax* is represented by 3 species: *A. amazili* (Burmeister, 1839), *A. concolor* Brauer, 1865, and *A. longipes* Hagen, 1861 (Heckman 2006).

Anax amazili has a wide distribution which extends from the USA (Texas) to Uruguay, and probably occurs throughout South America but, up to now has only been confirmed in French Guiana, Venezuela, Ecuador, Peru, Paraguay, Argentina, Uruguay and Brazil.

In Brazil, this species was previously observed in the states of Pará, Pernambuco, São Paulo, Espírito Santo and Rio de Janeiro (Hagen 1890; Calvert 1905; Costa and Oldrini 2005; Heckman 2006) (Figure 1A). We have reported *A. amazili* for the first time in southern Brazil, adding a new record for the state of Rio Grande do Sul, and extending its current distribution.

This species is characterized by a greenish yellow face with a black or brown triangle bordered by yellow, and often a small blue or brownish triangle on either side (Figure 2B). Its bright color and large size make the species highly conspicuous.

Specimens studied in the present paper were collected in wetlands of the state of Rio Grande do Sul, southern Brazil (Figure 1B) during a field trip for a research project conducted by the Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos, Universidade do Vale do Rio dos Sinos, aimed at characterizing the biodiversity of wetlands in southern Brazil. The studied wetlands were classified as permanent systems or intermittent systems. Permanent wetlands retain water for the entire hydrological cycle, whereas intermittent wetlands eventually dry up, retaining water for at least four months of the year (Maltchik *et al.* 2004). Moreover, the wetlands were divided into palustrine and lacustrine subsystems (Maltchik *et al.* 2004). The main difference between palustrine (e.g., marshes, peatlands, wet meadows) and lacustrine (e.g., shallow lakes and ponds) is the degree of interaction between water volume and drainage area (Bernaldez and Montes 1989). The influence of the terrestrial ecosystem is maximized in palustrine wetlands, and declines as the relationship between inundation area/water volume decreases. In practical terms, the surface water of the lacustrine subsystem is enclosed in the drainage area while the boundaries of the palustrine wetlands are not clearly defined. The classification of aquatic vegetation in the studied wetlands was based on the presence (when vegetation cover was higher than 30% of the total wetland surface) and the macrophyte types (submerged, floating, emergent, etc) of the dominant species. The aquatic bed wetlands were represented by submerged and floating plant species, and the emergent wetlands were composed of erect herbaceous vegetation.

The specimens were collected in four wetlands of southern Brazil: 1) intermittent palustrine wetland covered by emergent vegetation in Santo Antonio municipality (Chicolomã) (Figure 3A) (29°54'41" S, 50°30'41" W), 03/05/2002, one naiad; 2) permanent lacustrine wetland without vegetation in Palmas municipality (Figure 3B) (31°07'22" S, 53°46'46" W), 21/04/2002, one naiad; 3) permanent lacustrine wetland covered by aquatic bed vegetation in Encruzilhada do Sul municipality (Figure 3C) (30°48'19" S, 52°34'11" W), 25/07/2002, five naiads, and 4) permanent lacustrine wetland covered by emergent and aquatic bed vegetation in Mostardas municipality (Parque Nacional da Lagoa do Peixe) (Figure 3D) (31°32'09" S, 51°15' 56" W), 22/08/2009, two naiads (Figure 2C), one male and one female. All specimens are currently deposited at Coleção de Macroinvertebrados Aquáticos do Laboratório de Ecologia e Conservação de Ecossistemas Aquáticos da Universidade do Vale do Rio dos Sinos (UNISINOS), São Leopoldo, state of Rio Grande do Sul, Brazil. The examined specimens (Figure 2B)

perfectly match the description of *A. amazili* and do not show significant morphological variation.

A total of nine naiads were collected and two ultimate stadium naiads were selected for rearing until the emergence of imago. The remaining naiads were fixed and preserved in alcohol 70GL. The maintenance of naiads and imago specimens followed the methodology described by Lencioni (2005). One male and one female emerged (Figure 2A), and were identified using the keys of Calvert (1905) and Heckman (2006). Mature specimens had the color exhibited in Figure 4. To confirm the species, the naiads preserved in alcohol were compared with the Heckman´s key (2006) for *Anax* naiads and with the exuviae of the emerged imagos. We declare that our data collection complied with current Brazilian law.

The new records of *A. amazili* in southern Brazil suggest that more detailed taxonomic efforts should be made to determine the Odonate diversity in the wetland systems of this region.

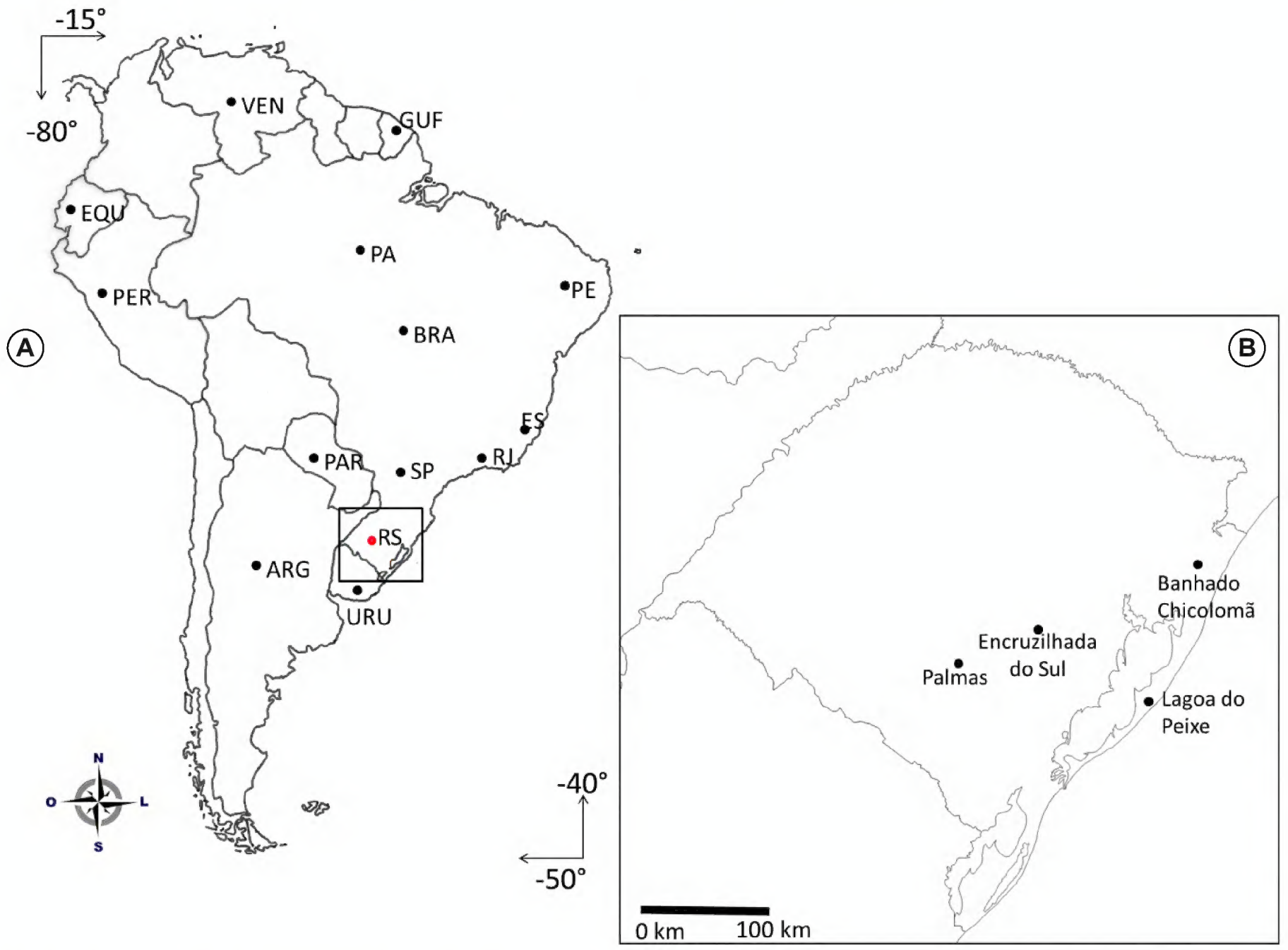

Figure 1. A) Previous known distribution (black spots) of Anax amazili and the current record (red spot); B) Detailed map of the occurrence of *Anax amazili* in wetlands of the state of Rio Grande do Sul, southern Brazil.

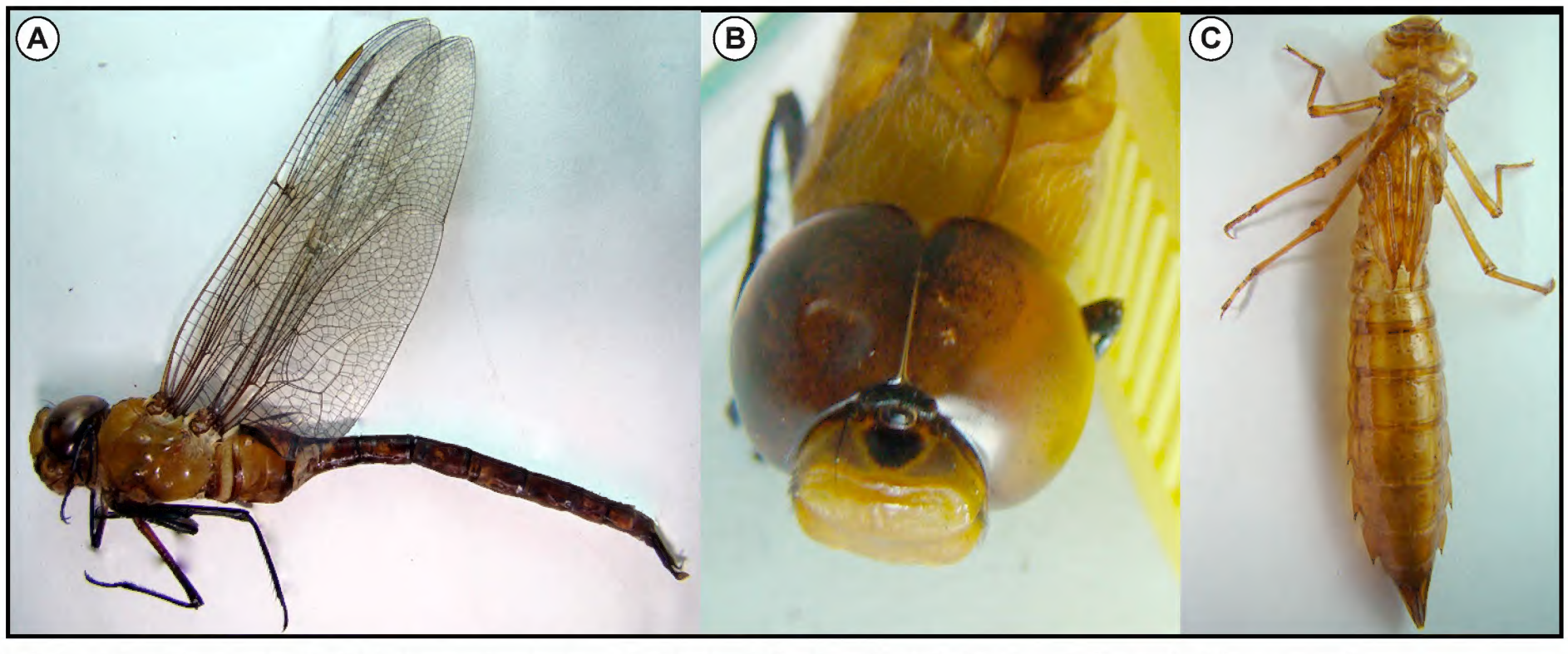

Figure 2. A) Male of *Anax amazili*; B) character diagnosis: a black triangle bordered on the head, and; C) naiad of *Anax amazili*.

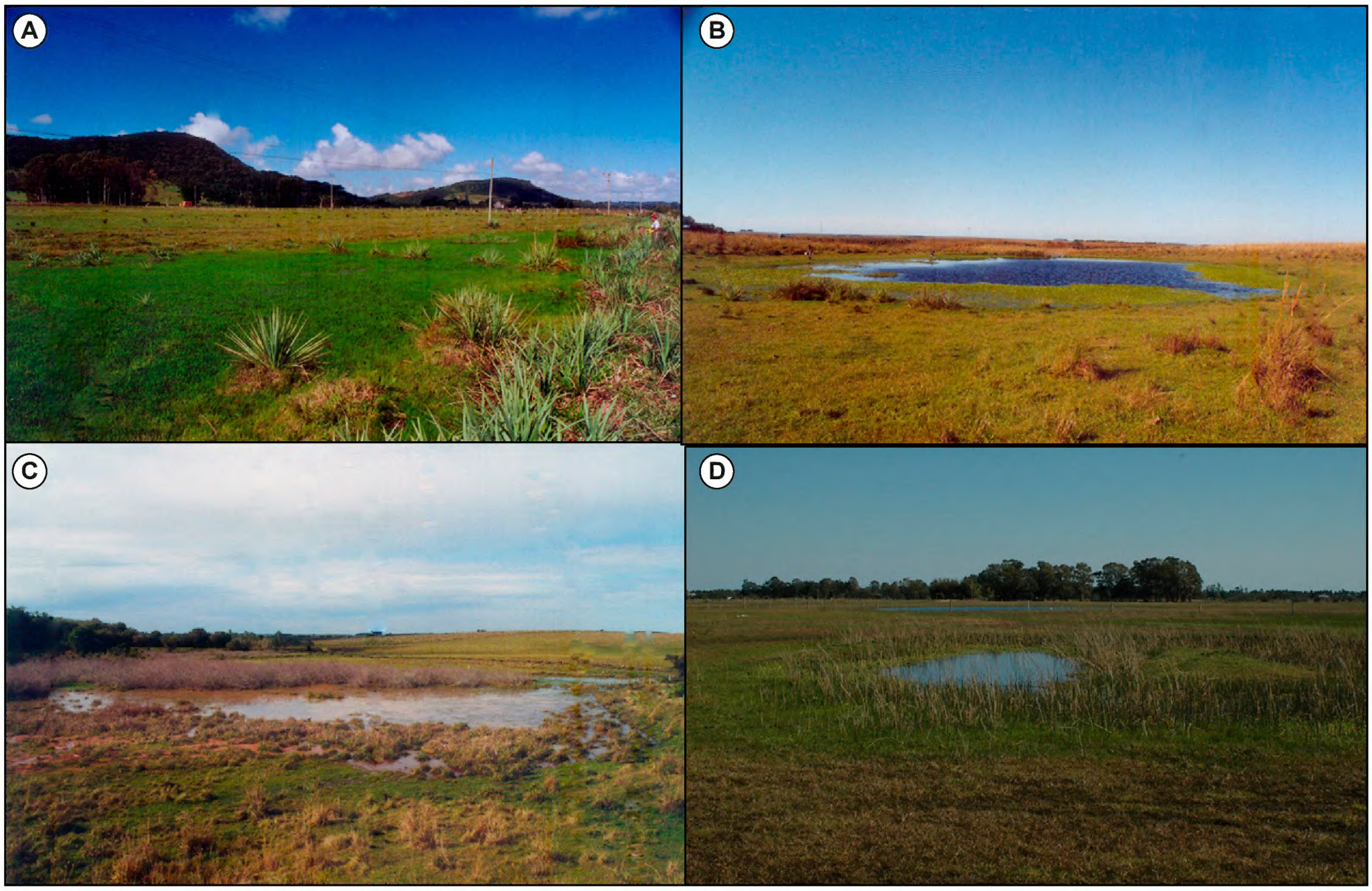

Figure 3. A) Wetland in Santo Antonio municipality (Chicolomã); B) Wetland in Palmas municipality; C) Wetland in Encruzilhada do Sul municipality; D) Wetland in Mostardas municipality (National Park of Lagoa do Peixe).

Figure 4. Mature live adult male of *Anax amazili*.

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ERRATUM

Anax amazili was already cited for Rio Grande do Sul state in two previous papers by Costa (1971) and Teixeira (1971). These papers registered the species for the Santa Maria and Porto Alegre municipalities. We did not have access to both articles prior to our own submission, and we would like to thank colleagues that told us about our mistake. Although the paper is not a *First Record*, the study extends the geographical distribution of *Anax amazili*, including a protected area.

We apologize for our mistake.

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